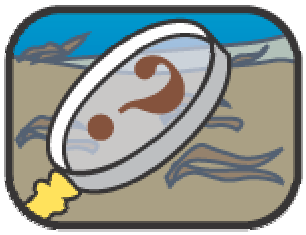

Lessons from the Bay

Who Killed SAV?

What factors have contributed to the decline of submerged aquatic vegetation in the Chesapeake Bay?

Objectives

Students will

- examine four major causes of bay grass decline
- defend, compare, and discriminate between arguments for and against a given factor
- evaluate the level to which certain natural and human factors led to the decline of bay grasses.

Background

This lesson is adapted from "Who Killed Ese-Vee?" in the Chesapeake Bay Foundation's Bay Grasses in the Classes *curriculum. The lesson is intended as a follow-up to "Grasses, Grasses Everywhere."*

Submerged aquatic vegetation (SAV) provides an essential link in the balanced health of the Chesapeake Bay and its tributaries. Like grass in the schoolyard, SAV requires light, water, and nutrients to survive. In turn, these grasses produce the oxygen necessary for the survival of underwater organisms. Underwater grasses, such as wild celery, eelgrass, and widgeon grass, provide shelter for fish, shellfish, and many other invertebrates. SAV provides food for waterfowl as well as for the animals it shelters. SAV helps to maintain water quality and clarity, working as a natural filter to trap sediment. SAV roots provide stability to the bottom of the Bay and its tributaries, playing a vital link in preventing erosion and further sediment pollution. SAV absorbs nutrients for its own benefit, and this in turn benefits the underwater environment by helping to keep nutrient levels in check.

Since the 1960s, over half of the Bay's SAV has disappeared. It is impossible to pinpoint one single cause of this decline, but it seems likely that the very pollutants SAV removes from the water are partly to blame. Excessive amounts of sediment cloud the water and block out the sunlight vital for the survival of underwater grasses. Likewise, excessive nutrients cause large algal blooms, which block out the sunlight. Hurricanes and dredging have also contributed to the decline. In this lesson, students will research these natural and human factors in order to defend or prosecute each "suspect."

Related Standards of Learning

Science:
3.1.a; 3.1.c; 3.1.g; 3.6.a; 3.6.b; 3.6.c; 3.10.a; 3.10.b; 3.10.c; 4.1.b; 4.5.c; 4.5.d; 4.5.f; 4.8.a; 4.8.b; 4.8.d; 5.5.b; 5.5.c; 5.5.d; 5.6.b; 5.6.c; 5.7.e; 5.7.f; 6.7.d; 6.7.e; 6.7.f; 6.7.g

English:
3.1; 3.2; 3.10; 4.1; 4.2; 4.6; 4.8; 5.1; 5.2; 5.3; 5.7.a; 5.8; 5.9; 6.2; 6.3; 6.5; 6.7

History and Social Science:
VS.1.b; VS.1.d; VS.1.h; USI.1.3; USII.1.e; USII.2.b; USII.8.b

Time Required

Two 45-minute sessions, with time allowed between for student research and preparation

Materials

- *Internet access*

For each student:

- Who Killed SAV? *(booklet, pages 65–74)*
- *Trial Worksheet, according to suspect assigned to group (handouts, pages 79–101)*

Classroom Assessment Suggestions

- *Trial Worksheets*
- *Group presentations*
- *Class discussion of guilty "suspects"*

Procedures

Session 1 (45 minutes, plus additional time for research)

Conduct this session in the classroom.

1. Begin reading aloud *Who Killed SAV?* (see Materials). Stop at the bottom of page 5 to allow students to make predictions. *What could possibly have caused SAV to disappear?*
2. Continue reading, stopping after each suspect is described to summarize the ways in which that suspect harmed SAV.
3. Divide the class into groups of 3–4 students, and assign each group a suspect: Hurricane Agnes, Clam Dredging, Development, or Nutrients. Within each group, designate one student the "accused," one the "defender," and one or more the "prosecutor(s)." Distribute the appropriate Trial Worksheets as guides for students in preparing their cases.
4. Allow time for students to prepare and plan their cases as well as to do further research as needed. (See "Using the Library Media Center for Project Research" and "Using the World Wide Web for Project Research" on pages 55–58 of the **Project Action Guide**.)

Session 2 (45 minutes)

Conduct this session in the classroom.

1. Call one group to the front of the classroom to act out their suspect's trial. Give the prosecutor(s) time to present the case against the accused; then allow the accused and defender to defend the charges. Direct the rest of the class to serve as members of the jury and take notes. Repeat this step for each suspect.
2. When all groups have presented, lead the class in a discussion of who is guilty among the four suspects. Alternatively, you may choose to have the class determine which suspect is *least* guilty, since it is impossible to blame only one factor for the demise of SAV.

   It is important for students to realize that land-use practices and other factors that contribute to the decline of SAV levels can be prevented or reversed. Still, students should recognize that there are two sides to every argument. For example, watermen who dredge for clams, though they are killing SAV, also have the right to earn a living.

Resources

"Bay Grasses." *Chesapeake Bay.* Maryland Dept. of Natural Resources. <http://www.dnr.state.md.us/bay/sav/>.

"Bay Grasses." Chesapeake Bay Program. <http://www.chesapeakebay.net/baybio.htm>.

Bay Journal 7.10 (Jan.–Feb. 1998). Alliance for the Chesapeake Bay. <http://www.bayjournal.com/98-02/index.htm>.

Chesapeake Bay Foundation. <http://www.cbf.org>.

Chesapeake Bay Foundation. *Watershed Action for Virginia's Environment (WAVE).* (See <http://www.cbf.org/site/PageServer?pagename=edu_educators_curriculum_va_index>, or contact the Virginia Office: Capitol Place, 1108 E. Main Street, Suite 1600, Richmond, VA 23219; phone 804-780-1392.)

Chesapeake Bay Foundation Guide to Underwater Grasses. Flash guide. Chesapeake Bay Foundation. <http://www.cbf.org/site/DocServer/Guide_to_Underwater_Grasses.pdf?docID=116>.

Chesapeake Bay Foundation, and Maryland Dept. of Natural Resources. *Bay Grasses in Classes.* (See <http://www.cbf.org/site/PageServer?pagename=edu_educators_restoration_grasses>.)

Chesapeake Bay Program. <http://www.chesapeakebay.net>.

ChesSIE: Chesapeake Science on the Internet for Educators. Virginia Institute of Marine Science and Chesapeake Bay Program. <http://www.bayeducation.net>.

"Using the Library Media Center for Project Research." Project Action Guide. *Lessons from the Bay*. 55–56.

"Using the World Wide Web for Project Research." Project Action Guide. *Lessons from the Bay*. 57–58.

Extensions for Students

- *Survey the schoolyard to identify land-use practices that contribute to increased sediment and nutrient runoff, and develop an action plan for addressing the problem.*
- *Participate in the Chesapeake Bay Foundation's* Bay Grasses in the Classes *Restoration Program (see Resources).*
- *Write persuasive letters to clam dredgers, developers, farmers, homeowners, and others encouraging them to use the land more wisely in an effort to save underwater grasses.*